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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,042	06/01/2005	Stephan Claude De La Veaux	CH2905US/PT	1319

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Legal- Patents
Wilmington, DE 19898

EXAMINER

YOUNG, NATASHA E

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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12/03/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/537,042

Applicant(s)

DE LA VEAUX ET AL.

Examiner

NATASHA YOUNG

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 17, 19, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6, 17, 23 and 24 is/are allowed.
- 6) ☒ Claim(s) 19 is/are rejected.
- 7) ☒ Claim(s) 1, 17 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

The claims are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Claims 1, 17, and 19 are objected to because of the following informalities: Regarding claim 1, the phrase "the tubular region which tubular region extends" (see line 17) should be "the tubular region, which extends". Regarding claim 17, a comma should be after the first occurrence of the words "tubular region" (see line 15). Regarding claim 19, a comma should be between "two zones" and "a spacer" (see line 15). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 19 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 19 cites "the entrance of the reaction chamber being aligned with the inlet to the reactor chamber" (see lines 11-12). Throughout the specification the terms reaction chamber and reactor chamber seemed interchangeable and the drawings do not show a reactor chamber within a reaction chamber such that the examiner does not see a distinction between the two chambers.

Allowable Subject Matter

Claims 1-6, 17, and 23-24 are allowed.

The closest prior art references are Gruenberger et al (Continuous Production of Fullerenes and Other Carbon Nanomaterials on a Semi-Industrial Scale using Plasma Technology, 2002), Rao et al (US 5,874,134), Yuill (US 2002/00192138 A1), and Hilgers et al (US 3,586,489).

Regarding claim 1, Gruenberger et al discloses a reactor for the production of nanoparticles in an aerosol process comprising: (a) a reaction chamber having a wall, an inlet and an outlet the inlet for introducing a hot carrier gas to the reaction chamber which hot carrier gas flows downward from the inlet through the reaction chamber and out the outlet, (b) a quench zone located downstream of the reaction chamber having an inlet and an outlet, (c) one or more quench inlets being positioned approximately

about the outlet of the reaction chamber for introducing a quench material (See pages 8-9 and figure 1).

Rao et al discloses a reactor wherein the tubular region converges twice and has radially distributed reactant inlets (see figure 2A and column 6, lines 3-61).

The prior art references do not disclose or suggest (d) radially distributed reactant inlets positioned between the reaction chamber inlet and the quench inlets for introducing one or more reactants; the reaction chamber comprising a spacer zone and a homogenization zone: (i) a spacer zone having a length, L_1 , extending from the reaction chamber inlet and ending approximately about the reactant inlets having an upper diameter converging, upstream of the reactant inlets, to a lower diameter tubular region, the spacer zone having a recirculation zone, the reactant inlets being downstream of the recirculation zone and positioned to introduce reactants into the tubular region which tubular region extends into the homogenization zone and (ii) the homogenization zone including the tubular region which is followed by a converging section which converges to a nozzle tip, the homogenization zone having a length L_2 extending from approximately the location of the reactant inlets and ending approximately about the quench zone inlet; the spacer zone for allowing the hot carrier gas to carry the reactants downward towards the homogenization zone, the homogenization zone for contacting the reactants under conditions suitable for forming a reaction product and passing the reaction product to the quench zone, L_1 being sufficient for the hot carrier gas to attach to the wall of the spacer zone of the reaction chamber prior to the reactant inlets and L_2 being sufficient for a residence time of the

reactants within the homogenization zone suitable for forming the reaction product which when withdrawn from the outlet of the quench zone are nanoparticles.

Claims 2-6 and 23-24 depend on claim 1.

Regarding claim 17, Gruenberger et al discloses a reaction chamber for minimizing flow recirculation in a reactor for the production of reaction product nanoparticles, the reaction chamber comprising a wall, an entrance and an exit a hot carrier gas inlet located about the entrance of the reaction chamber and quench material inlets located about the exit of the reaction chamber (see pages 8-9 and figure 1).

Rao et al discloses a reactor wherein the tubular region converges twice and has radially distributed reactant inlets (see figure 2A and column 6, lines 3-61).

The prior art references do not disclose or suggest radially distributed reactant located between the hot carrier gas inlet and the quench inlets, the reactant inlets being located downstream of a recirculation zone created by the hot carrier gas as it flows downward from the hot carrier gas inlet toward reactant inlets, the hot carrier gas inlet and reactant inlets being oriented for a downward flow direction of the hot carrier gas and reactant, the reaction chamber comprising a spacer zone and a homogenization zone (i) the spacer zone having a length, L1, extending from the reaction chamber entrance and ending about the reactant inlets having an upper diameter converging, upstream of the reactant inlets, to a lower diameter tubular region which reactant inlets are positioned to introduce reactants into the tubular region, the tubular region extending into the homogenization zone, and (ii) the homogenization zone including the

tubular region followed by a converging section which converges to a nozzle tip and having a length L2 extending from the reactant inlets to a position downstream of the quench inlets for contacting the hot carrier gas and the reactants and wherein L1 of the spacer zone is sufficient for the hot carrier gas to attach to the wall of the reaction chamber before the hot carrier gas reaches the reactant inlets and L2 of the reaction chamber being sufficient for a residence time within the homogenization zone suitable for forming the reaction product nanoparticles.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA YOUNG whose telephone number is 571-270-3163. The examiner can normally be reached on Mon-Thurs 7:30 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. Y./
Examiner, Art Unit 1797

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797